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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/653,824	09/03/2003	W. Keats Wilkie	LAR 15816-2	7294

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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EXAMINER

KIM, PAUL D

ART UNIT

PAPER NUMBER

3729

DATE MAILED: 07/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/653,824

Applicant(s)

WILKIE ET AL.

Examiner

Paul D. Kim

Art Unit

3729

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 13-15 and 28-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 16-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/22/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This office action is a response to the restriction requirement filed on 5/4/2005.

Response to the Restriction Requirement

1. Applicant's election without traverse of Group I, claims 1-12 and 16-27, in the reply filed on 5/4/2005 is acknowledged.
2. Claims 13-15 and 28-30 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 5/4/2005.

Specification

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: --A METHOD OF FABRICATING COMPOSITE APPARATUS--.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-12 and 16-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oakley et al. (US PAT. 6,088,894) in view of Lazarus et al. (US PAT. 6,404,107).

As per claims 1 and 16 Oakley et al. teach a process of fabricating a piezoelectric compositing element comprising steps of: providing a plurality of wafers of piezoelectric material (82); bonding the wafers together with an adhesive material (84) to form a stack of alternating layers of piezoelectric material and adhesive material, the stack having a thickness as shown in Figs. 6 (a) and (b); cutting through the stack in a direction substantially parallel to the thickness of the stack and across the alternating layers of piezoelectric material and adhesive material to provide at least one piezoelectric fiber sheet comprising a plurality of piezoelectric fibers (88) in juxtaposition to adhesive material, the at least one piezoelectric fiber sheet having a first side and a second side as shown in Fig. 6 (c); providing a first film (90, top portion) and a second film (90, bottom portion) as shown in Fig. 6 (d); bonding the second film to the second side of the at least one piezoelectric fiber sheet as shown in Fig. 6 (e); and bonding the first film to the first side of the at least one piezoelectric fiber sheet as shown in Fig. 6 (e) (see also col. 11, lines 28-65).

As per claims 2 and 17 the wafer of piezoelectric material comprises a monolithic piezoelectric material (PZT).

As per claims 3 and 18 each piezoelectric fiber has a substantially rectangular cross-section as shown in Fig. 6 (c).

As per claim 8 the first film and the second film each have a longitudinally extending axis and the step of cutting produces at least one piezoelectric sheet having a plurality of piezoelectric fibers that extend in the direction of the longitudinal axes of the first and second films as shown in Fig. 6 (d).

However, Oakley et al. fail to teach the first film having a first conductive pattern and a second conductive pattern formed thereon, the first conductive pattern being electrically isolated from the second conductive pattern, the first and second conductive patterns each having a plurality of electrodes that cooperate to form a pattern of interdigitated electrodes such that the conductive patterns of the first film electrically contact the piezoelectric fibers of the at least one piezoelectric fiber sheet. Lazarus et al. teach a process of fabricating a piezoelectric compositing element including a process of forming a first film (412) and a second film (414, as per claims 5 and 20), wherein a piezoelectric element (404) is located therebetween the first film and second film as shown in Fig. 10C. The first film and the second film include a first conductive pattern (402) and a second conductive pattern (402) formed thereon and the first conductive pattern being electrically isolated from the second conductive pattern and the first and second conductive patterns each having a plurality of electrodes that cooperate to form a pattern of interdigitated electrodes (408) such that the conductive patterns of the first film electrically contact the piezoelectric element (404) of the at least one piezoelectric fiber sheet. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the first and second conductive films of Oakley et al. by a first film and a second film including a first

conductive pattern and a second conductive pattern having a plurality of electrodes that cooperate to form a pattern of interdigitated electrodes as taught by Lazarus et al. in order to for the purpose of integrating the composite element with the system to be actuated, controlled and damped (also see col. 3, lines 18-38, and col. 12, lines 13-62).

As per claims 4 and 19 Lazarus et al. also teach that at least one of the conductive patterns is made of copper (see col. 11, lines 4-6).

As per claims 6, 12, 21 and 27 Lazarus et al. also teach that electrically conductive extensions are attached as shown in Fig. 10A to the first and second conductive patterns of the first film and attaching electrically conductive extensions to the first and second conductive patterns of the second film.

As per claims 7, 10, 11, 22, 25 and 26 Lazarus et al. also teach that the second film is bonded by an epoxy or adhesive applied to the at least one piezoelectric fiber sheet follow by curing to provide robust mechanical and electrical coupling to the enclosed element (col. 3, lines 17-38).

As per claims 8 and 23 Oakley et al. also teach the first film and the second film each have a longitudinally extending axis and the step of cutting produces at least one piezoelectric sheet having a plurality of piezoelectric fibers that extend in the direction of the longitudinal axes of the first and second films as shown in Fig. 6 (d).

As per claims 9 and 24 each interdigitated electrode of the first and second conductive patterns extends of Lazarus et al. can be extended in a direction that is substantially perpendicular to the longitudinally extending axes of the first and second films and substantially perpendicular to the longitudinally extending direction of the

plurality of piezoelectric fibers of Oakley et al. as shown in Fig. 6 (d) in order to provide torsion actuation.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul D. Kim whose telephone number is 571-272-4565. The examiner can normally be reached on Monday-Friday between 7:00 AM to 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 571-272-4690. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Paul D Kim
Examiner
Art Unit 3729